

What is claimed is:

SVB 27
5 1. A process for preparing polysulfides, comprising reacting sodium sulfide with oxygen in the presence of a transition metal oxide, with the concentration of the catalyst ranging from 0.05 to 6.5 g/l, where the consumption rate of O₂ is at least 1.5x10⁻⁴ moles/l/sec, such that a selectivity of polysulfides greater than 65% is achieved.

2. The process of claim 1, wherein the consumption rate of O₂ is at least 2x10⁻⁴ moles/l/sec.

10 3. The process of claim 1, wherein the consumption rate of O₂ is at least 4x10⁻⁴ moles/l/sec.

4. The process of claim 1, wherein the reaction is conducted in a self-recirculated reactor.

5. The process of claim 4, wherein the reactor is a hollow shaft reactor.

6. The process of claim 1, wherein the transition metal oxide is MnO₂.

15 7. The process of claim 1, wherein the consumption rate of oxygen is controlled through the control of the partial pressure of oxygen in the reaction.

8. The process of claim 4, wherein the consumption rate of oxygen is controlled through the control of the partial pressure of oxygen in the reaction.

20 9. The process of claim 1, wherein the temperature at which the reaction is conducted is in the range of from about 70 to 99°C.

(10.) The process of claim 9, wherein the temperature is in a range of from about 75 to 85°C.

(11.) The process of claim 9, wherein the temperature is in the range of from about 75 to 80°C.

5 12. The process of claim 4, wherein the retention time in the reactor range is from about 2 to 15 minutes.

13. The process of claim 12, wherein the retention time ranges from about 3 to 10 minutes.

10 14. The process of claim 12, wherein the retention time ranges from about 3 to 5 minutes.

15. The process of claim 4, wherein the oxygen consumption is greater than 4×10^{-4} moles/l/sec.

16. The process of claim 1, wherein the selectivity is greater than 75%.

17. The process of claim 1, wherein the selectivity is greater than 90%.

15 18. A process for preparing polysulfides, comprising reacting Na_2S with oxygen in the presence of a transition metal oxide, with a concentration of the metal oxide ranging from 0.05 to 6.5 g/l, and where the consumption rate of O_2 is sufficient and the partial pressure of oxygen is controlled to achieve a selectivity of polysulfides greater than at least 85%.

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19. The process of claim 18, wherein the selectivity of polysulfides achieved is greater than at least 90%.

20. The process of claim 18, wherein the reaction is conducted in a self-recirculated reactor.

5 21. The process of claim 18, wherein the reaction is conducted in a hollow shaft self-recirculated reactor.

22. The process of claim 18, wherein the transition metal oxide is MnO_2 .